



Rack Infrastructure Update

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What are racks for?



Providing organized space

Modular racks help organize electronics for different subsystems

Providing power

- Clean AC power to all necessary experiment electronics at LArTF
- AC power for any short-term auxiliary testing equipment at LArTF
- AC power for equipment test stands

Providing safety for electronics

- Hardware power interlocks in case of fire
- Hardware interlocks between subsystems
- Fusing to protect components from too much current
- Temperature and protection system monitoring via slow control system



What racks do we have?



Most racks at DAB; DAQ racks at CDF





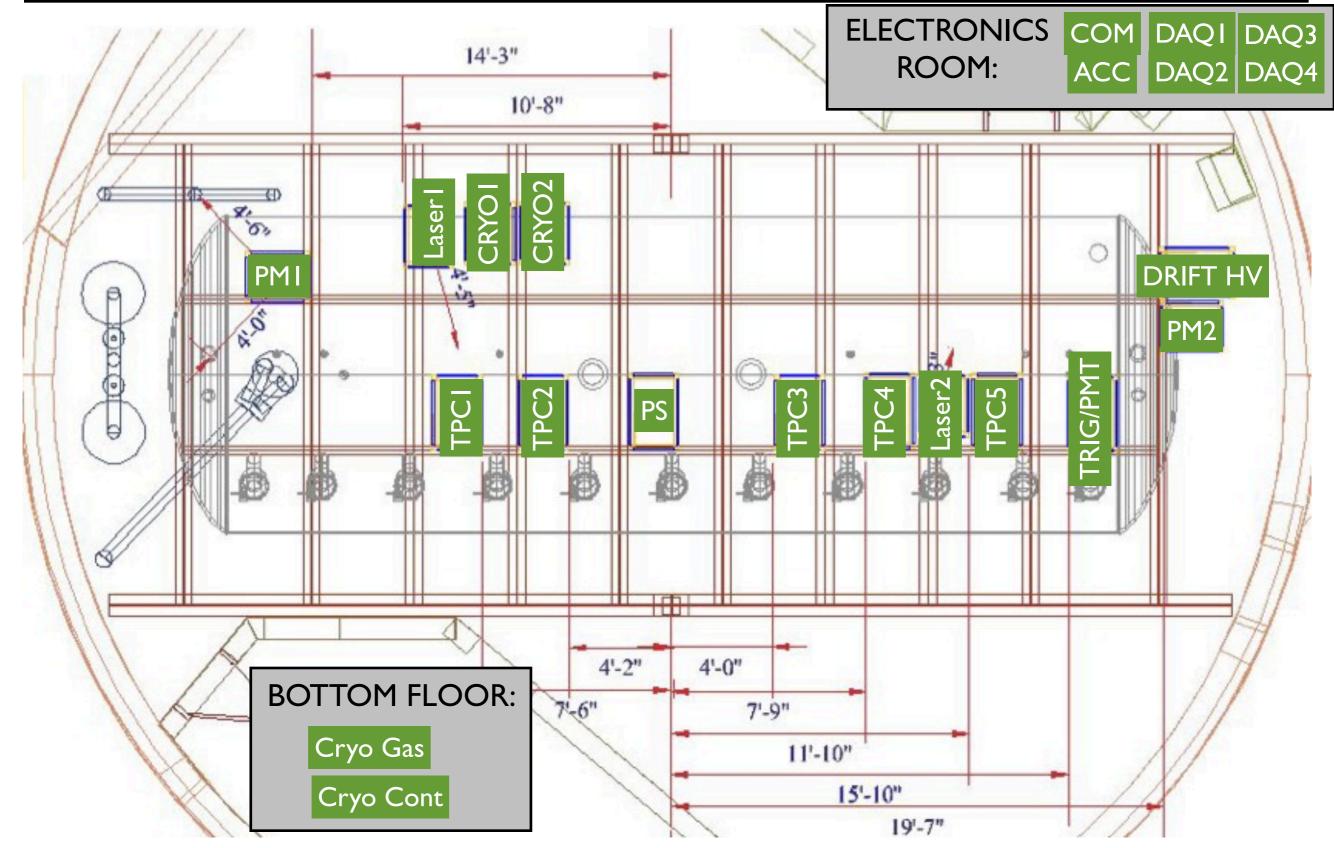
Rack back-ends





Where will they go?



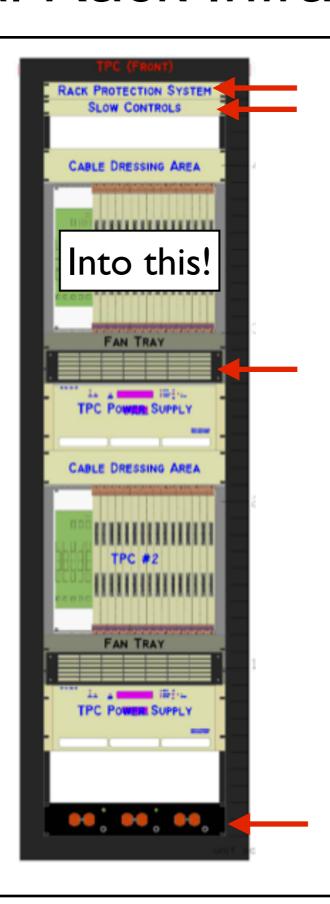




General Rack Infrastructure







- Components common to all racks:
 - Rails, Shelves
 - Rack Protection System:
 - Smoke Detector
 - RPS chassis
 - AC Interlock
 - AC Power Distribution
 - Many Racks: Fans
 - Slow Controls

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Rails and Shelves



- Plenty of racks, shelves pilfered in/around DAB
- Necessary customization for Wiener shelving complete
 - cutouts match Wiener cooling area





Pilfered rack rails

Customized rack shelving



Smoke Detector and RPS Chassis



Smoke detector and interlock chassis

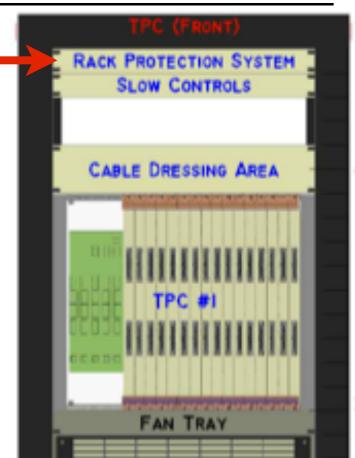
- Smoke detector
- Attendant 1U chassis and logic generates interlock signal from smoke detector state
- Signal sent to AC interlock box

Prototype chassis successfully running in DAQ test stand

- Engineering review passed on October 26
- Proceeding with pre-production of 5 additional units
- For production, smoke detectors at top of rack



Rack Protection Interlock Box





Smoke Detector on DAO Test Stand

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Rack Infrastructure: AC

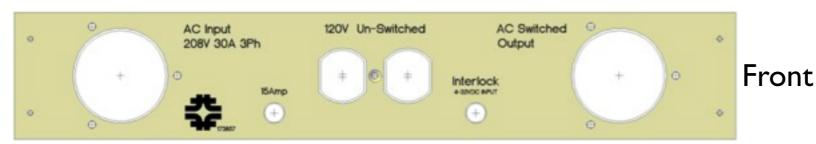


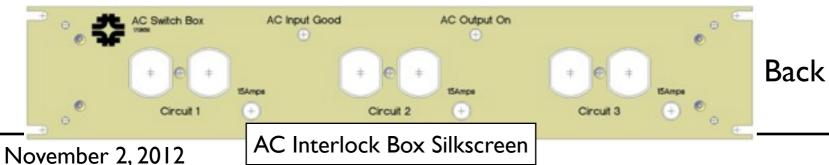
AC Power Distribution

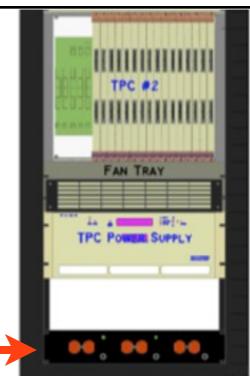
- Eaton power strip with 24 outlets of clean power to back of rack
- Need to order

AC Interlock box

- Switches Eaton power strip on or off depending on smoke detector status sent from RPS chassis
- 6 additional switched clean power outlets on rack front
- 2 unswitched outlets for RPS chassis and slow control
- Prototype built and reviewed; parts ordered for 5 pre-production boxes











Rack Infrastructure: Fans



3U 6-fan boxes being re-furbished

- 9 Total; for cooling TPC readout crates
- Deconstructed; new fans arrive in December
- Monitored by slow control

Smaller fan boxes

- Many 1U available units in DAB
- Will not talk to slow control









Slow Control

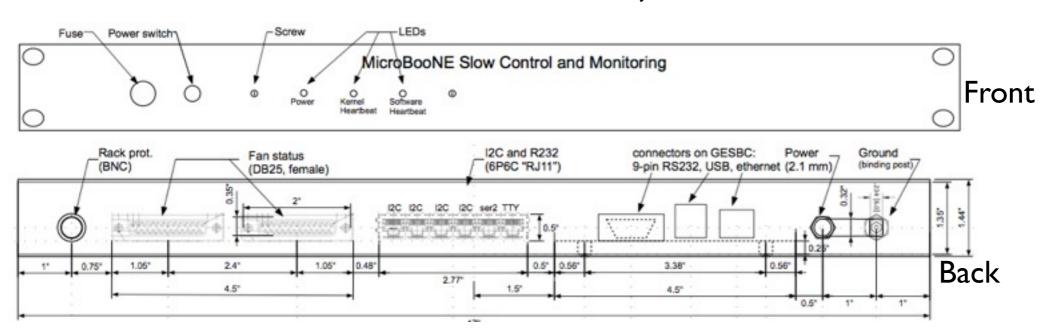


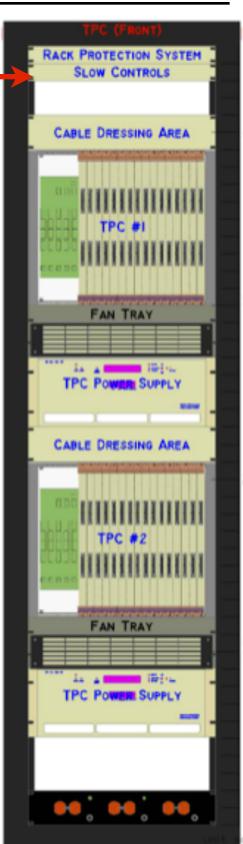
Single-board computer processing signals:

- Temperature sensors
- RPS status
- Fan status: for 2U fans only

Info from other electronics in each rack

- Not everything some have direct network connection
- Particularly drift HV: monitoring versus control?
- Info available in database, GUI







DAQ Test Stand Rack



Tested rack infrastructure, highlighted needs:

- Prototype RPS (combined with Pulizzi AC distribution)
- Back and front rack panels or doors
- Proper temperature regulation

Passed readiness review

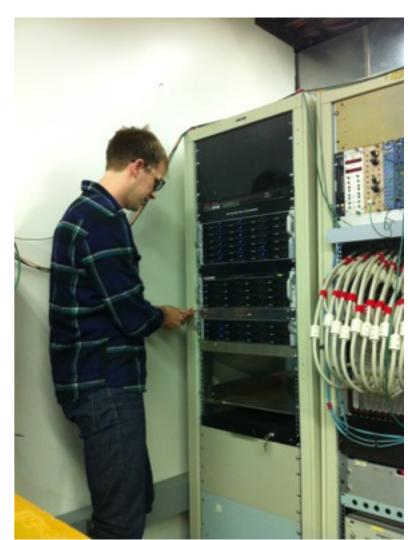
Can now run test DAQ rack (DAQ only!) unattended!



DAQ test stand



Back-end Lexan door



Screwing front-end panels



TPC Racks



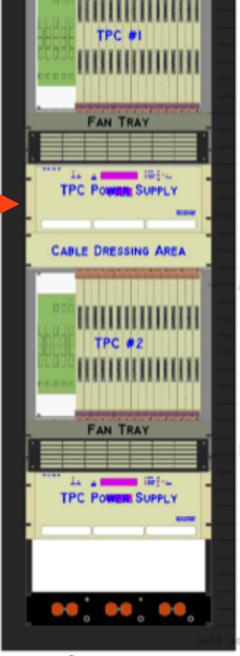
- Have 3 Wiener power supplies
 - Old units in DAQ Test Stand and at PAB
 - First production unit: stored in DAB
- Designed fuses and power distribution to Wiener TPC power supplies
 - DAQ test stand supply has some of these connections
- To-do: make these production parts



DAQ test stand Wiener back-end power distribution



Flexible cable for distribution, fusing



CABLE DRESSING AREA

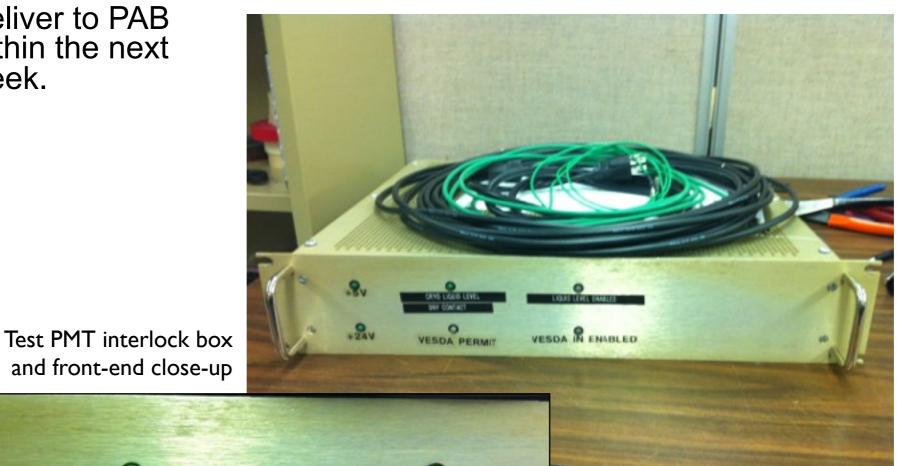
TPC Rack outline



PMT/Trigger Rack



- Providing interlock between liquid level and PMT high voltage
 - Re-purposed D0 interlock box for this purpose
 - Operating properly; addressing a few remaining issues
 - Deliver to PAB within the next week.





and front-end close-up

VESDA PERMIT



PMT/Trig Rack outline



Drift HV, Laser



- Interlocks similar to PMT HV:
 - Laser: interlock with PMTs, Cryo liquid level
 - Drift HV: interlock with cryo liquid level
- HV: Provided switch box and warning light
- Slow control
 - RS232 to slow control SBC
 - control versus monitoring

Example laser interlock box front-end





Drift HV switch and warning light



Other Racks



Com, Accel

Nothing to report here; nothing special requested

Cryo Purity Monitor

Nothing to report here; nothing special requested

Cryo Gas and Cont

Nothing to report here; nothing special requested

DAQ Racks

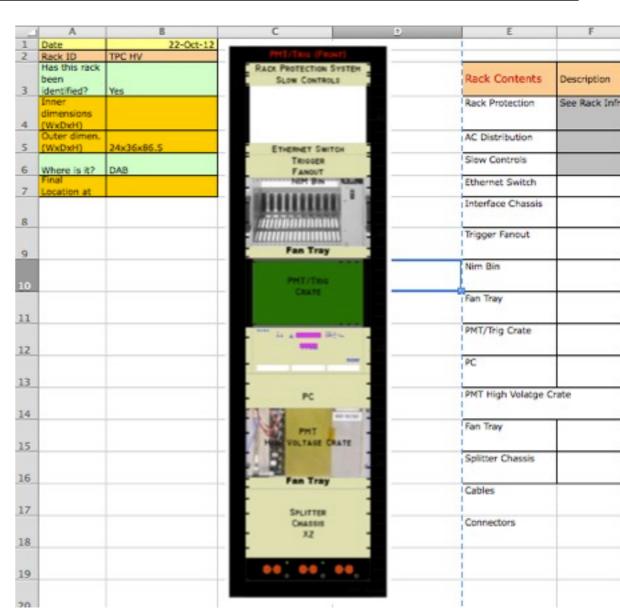
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Note: Keeping Things Organized



- Master rack info spreadsheet
 - Working on this
 - Much of the info is currently located in Linda's head
- Rack blueprinting
 - Have PDF layout of every rack
 - Plan to outline this layout with a scribe physically on each rack to optimize spacing and order front panelling



Will be working on a cable-labeling system



Note: Prettification



- Thanks for the paint job!
- Fancy labels will be printed, affixed to each rack
 - Linda knows more about this...
- General infrastructure box fronts will be silkscreened
- Front panels will be shiny and new



Summary



A lot has been done, a lot left to do!